Socioeconomic Aspects of HIV & AIDS in developing Countries: a review and annotated bibliography.

02922

cpf/30184

SOCIOECONOMIC ASPECTS OF HIV AND AIDS IN DEVELOPING COUNTRIES

a review and annotated bibliography

Susan Foster and Sue Lucas

Health Policy Unit
Department of Public Health and Policy

PHP Departmental Publication No 3, 1991
Series Editor: Busi Chaane
ISSN: 0962-6115

Public Health and Policy Publications

This is the third in a new series of publications produced by the Department of Public Health and Policy, in the London School of Hygiene and Tropical Medicine. Discussion papers, reviews and annotated bibliographies will appear at least four times a year.

Prices for 1991

£5 - personal callers
£6/$15 - by post/overseas mail

Payment should be made by sterling cheque, banker's draft or UNESCO coupon and made out to the London School of Hygiene and Tropical Medicine.

Where sterling payments are made from a non-UK bank, a collection charge of £5 is also payable.

Publications are sent out on receipt of payment.

PHP Publications

No.1 Slum improvement: health improvement? (Stephens, Harpham 1991)

No.2 Economic aspects of AIDS and HIV infection in the UK (Gray 1991)

This series incorporates the EPC publications that ceased in 1990. Several of these are still in print, and available from the Health Policy Unit.

EPC Publications - all priced at £4 (personal callers)/£5/$15 (post)

No.13 Options for diarrhoeal diseases control: cost effectiveness of selected interventions (Phillips, Feachem, Mills 1987)

No.14 Acceptability of childhood immunization: social science perspectives (Heggenhougen, Clements 1987)

No.15 Government health care charges: is equity being abandoned? (Gilson 1988)

No.16 Community health workers: policy and practice in national programmes (Walt 1988)

No.17 Health economics for developing countries: a survival kit (Mills, Gilson 1988)

No.18 Traditional medicine and primary health care (Heggenhougen, Sesia-Lewis 1988)

No.19 Vitamin A supplementation and child survival (Mamdani, Ross 1988)

No.20 Health economics for developing countries - Special issue/training materials £10.00 (Gilson 1989)

No.21 Human resource development: management, planning, training of health personnel (Simmonds, Bennett-Jones 1989)

No.22 Medical anthropology and primary health care (Heggenhougen, Draper 1990)

02922
DIS 325 N91
COMMUNITY HEALTH CELL
LIBRARY
AND
DOCUMENTATION
UNIT

The Environmental Health Unit's first publication is also available.

Methodology of enquiries into disease clustering (Elliott (ed) 1989)
Free

The Centre for Human Nutrition has occasional papers, books and teaching packs in print, which are available from them.

No.2	Nutrition: from myth and magic to science (Harper 1987) £1.50
No.3	Nutrition at the LSHTM 1924-45. A review of the work of the School in nutrition and related subjects (Doughty 1987) £1.00
No.4	Changes in infant feeding practices in Malaysia (King, Ashworth 1987) £2.50
No.5	Changes in infant feeding practices in the Caribbean (King, Ashworth 1987) £2.50
No.6	Changes in infant feeding practices in Nigeria (King, Ashworth 1987) £2.50
No.7	Changes in infant feeding practices in Zaire (King, Ashworth 1987) £2.50
No.8	Patterns of adult energy nutrition in a South Indian village (McNeill, Payne, Rivers 1988) £2.50
No.10	Intrahousehold food allocation (Wheeler 1988) £0.75
No.11	Statistical exercises in nutrition (Wheeler 1991) £6.00

(Not all available publications are listed here. Contact the appropriate unit/centre for fuller details).

All PHP publications are available from:

Department of Public Health and Policy
London School of Hygiene and Tropical Medicine
Keppel(Gower) Street
London WC1E 7HT
Telephone: 071 636 8636
Telex: 8953474
Fax: 071 436 3611.

BIOGRAPHIES

Susan Foster has been a lecturer in health economics in the Health Policy Unit at the London School of Hygiene and Tropical Medicine since 1989. Since gaining an MA in International Affairs from Ohio University in 1978, she has worked as an economist for the World Health Organization in Geneva on the Action Programme on Essential Drugs, and for the Population, Health and Nutrition Department of the World Bank in Washington DC. Her main research interests are the economic impact of AIDS and HIV-related illness, in particular the impact of care and treatment on the health services and on families. She is author of several publications on financing costs of essential drugs and the use of pharmaceuticals in developing countries.

Sue Lucas is Co-ordinator of the UK NGO AIDS Consortium for the Third World, a group of UK-based non-government organizations that have been working together since 1986 to update information and consolidate their responses to the AIDS epidemic in developing countries. Previously, she worked for ActionAid, a UK-based development agency, in Africa and in the UK, and for the Institute for Social Studies in Medical Care, also in the UK.

ACKNOWLEDGEMENTS

Many people were very generous in sharing with us unpublished papers, sending us articles which we might not otherwise have seen, and generally in making sure that this publication was as complete and up-to-date as possible. Inevitably, however, papers and articles which should have been included have not come to our notice in time and have thus been omitted. To those authors whose work should have been included, we apologize. We would like to thank participants in a workshop held to discuss an earlier draft of the paper for their many useful comments, and in particular, Anne Buve, Nancy Godfrey, Anne Mills, Phil Strong, Gill Walt, and Antony Zwi, and the staff of the Bureau of Hygiene and Tropical Medicine for keeping us supplied with recent articles. Member organizations of the UK NGO AIDS Consortium for the Third World were also generous with unpublished papers. We would also like to acknowledge the generous support of WHO's Global Programme on AIDS, and of Dr James Chin in particular, and to thank the UK ODA (Overseas Development Administration) for providing financial assistance for this research.

CONTENTS

Biographies		**v**
Acknowledgements		**vi**
Abbreviations used		**viii**
Summary		**1**
Chapter 1:	**Economics and the HIV epidemic**	**2**
Chapter 2:	**Who is at risk from HIV infection? How many will become ill?**	**5**
	The epidemiology of AIDS	5
	Risky behaviour, risk factors, and vulnerable groups	7
	i health workers	7
	ii mobile population groups	8
	iii drug users	10
	iv women	10
	v children	12
Chapter 3:	**Prevention and control: the effectiveness of interventions**	**14**
	Interventions to reduce transmission by sexual contact	15
	Interventions to prevent transmission through blood or other body fluids and in a health care setting	18
	Maternal transmission	19
Chapter 4:	**What will treatment cost and who will pay?**	**20**
	Evidence from the high-income countries	20
	Evidence from the low-income countries	24
Chapter 5:	**The wider impact of AIDS**	**28**
	Indirect cost estimates	28
	The impact on specific sectors or groups	29
	i the impact on the economy and society in general	29
	ii the impact on the household and family economy	31
	iii the impact on the labour force and specific economic sectors	32
	iv the impact on the health system and health workers	34
	v the impact at international level	36
Chapter 6:	**Conclusions: AIDS, economics, and research priorities**	**38**
Annotations and references		**41**
Country index		**116**

HEALTH CELL COMMUNITY LIBRARY AND DOCUMENTATION UNIT BANGALORE

ABBREVIATIONS USED

AIDS	Acquired Immune Deficiency Syndrome
CDC	Center for Disease Control, Atlanta, Georgia, US
DHLY	Discounted Healthy Life Years
GPA	Global Programme on AIDS .
HIV	Human Immunodeficiency Virus
HLY	Health Life Years
IV	Intra Venous
IVDU	Intra Venous Drug User
MTP	Medium Term Plan (goverment/WHO plan of AIDS control activities over 5 years, in countries where a National AIDS Committee has been established)
NHS	National Health Service (UK)
PCP	Pneumocystis carinii pneumonia
PWA	Persons/People With AIDS
QALY	Quality Adjusted Life Year
STD	Sexually Transmitted Disease
UNHCR	United Nations High Commissioner for Refugees
UNDP	United Nations Development Programme
WHO	World Health Organization

SUMMARY

Even though the AIDS epidemic is barely a decade old, the fact that it has spread so quickly to virtually all parts of the world has given rise to tremendous interest in all aspects of its prevention, control, and treatment. Inevitably economics, and economists, have made a contribution. This publication aims to present a review of the economic and socioeconomic literature available as of this date (January 1991). Over 150 articles and publications are listed, some with extensive annotations. We decided to include some unpublished and "grey" material in addition to published work; the epidemic is so recent that despite several new publications devoted exclusively to AIDS, much valuable research, especially on developing countries, has not yet been formally published. It is especially encouraging to see that governments which only a few years ago would not have consented to the publication of reports on the AIDS situation in their countries have apparently revised their position; this publication is much the richer for it, and we hope that the officials who chance to read this feel that the exposure, even though painful at times, is counterbalanced by the benefit of exchange of information and experience in dealing with the AIDS epidemic.

We have also chosen to include some publications from the industrialized countries if they contain useful information on methods, or if the issue they examine is of interest in developing countries as well. Some may find our definition of "economic aspects" to be quite broad; but we felt that a basic understanding of the epidemiological, demographic, and sociological aspects of AIDS and HIV infection was essential to an understanding of the economics.

The organization of this paper owes much to a paper by Anthony Pascal, entitled "Conceptual issues in assessing the economic effects of the HIV epidemic" (ref 123), in which he proposes four main economic questions to be addressed:

1) How many will become ill? Who will become ill?
2) How much will it cost to slow the spread of the infection? How effective are available approaches?
3) How much will it cost to treat the infection?
4) What wider economic consequences will ensue?

This is the schema we have chosen to organize the paper, introduced by a chapter which presents some thoughts on the contribution of economics so far, and the possible future directions for socioeconomic research.

CHAPTER 1

ECONOMICS AND THE HIV EPIDEMIC

The Human Immunodeficiency Virus was only described in the early 1980s, and the first cases of AIDS recorded in developing countries in around 1985-86. It is remarkable, therefore that this publication has been able to review as many publications as it has; there has been an explosion of information regarding AIDS and HIV. As the epidemic is still young, there are no "classics" of the literature to point to; although we are tempted to hazard a guess as to which articles may well find their way into the category of must-read "classics" given a few more years, we have instead marked with an asterisk (*) in the annotations those articles which appear to us, at this early stage, to have enduring value.

What has economics contributed to the control or the treatment of HIV-infection and AIDS? There is a growing literature on costs of treatment; yet too often it is not accompanied by costs of treatment of other comparable diseases. AIDS is expensive to treat; but so are most other chronic or terminal illnesses. Peter West of King's Fund College (ref 166), writing with reference to the UK NHS, makes the point that "the potential consequences of further spread of AIDS are clear enough without repeating rather crude and ever-larger estimates of what it is costing us to treat." He also observes that "if we continue to emphasize the cost of AIDS we may put it more strongly under scrutiny from the many people who see themselves at no risk of acquiring the disease. This could prove counter-productive ... why advertise how much the disease is costing if it is not going to increase the service but decrease it?"

West's concern applies equally to AIDS and HIV infection in developing countries. Failure to provide comparative costs has contributed to a fatalism regarding the treatment of AIDS which has spread to donor agencies; they are reluctant to get involved in such a "losing battle" yet their failure to get involved and provide needed support is probably undermining the health care system as a whole, and depriving others of needed care. Those thus indirectly affected include the under-fives who have received the bulk of international attention in the past ten or so years. Estimates of indirect costs pose even more of the type of problems mentioned above by West; the uncertainties surrounding the key parameters and the methodologies themselves are so great, and the usefulness of the estimates so correspondingly reduced, that one must ask whether economists' time could not be better employed.

Our departure point in reviewing the literature was a strong belief that economics and its methods have a great deal to contribute to the efforts to manage the HIV epidemic. Therefore

our interest was not to look at the validity of the methods used by various economists, nor even to try to judge the academic quality of the work done so far, but rather to ascertain to what extent economic work has proved useful to governments, donors, and others trying to cope with the epidemic. We have had to conclude that for the most part, economics has yet to play a significant role in helping countries to deal with the AIDS problem they face. (Interestingly, epidemiologists and social scientists whose work we reviewed also noted that a much greater contribution could be made by their disciplines to the study of AIDS.) There is much descriptive work, but little in the way of guidance as to which mix of inputs will prevent transmission of HIV; how best to manage the avalanche of AIDS cases which is overwhelming the health services in some countries. The tools of economic evaluation have, for the most part, yet to be applied to AIDS and HIV, especially in developing countries. We encountered no applications of cost-benefit or cost-effectiveness analysis to any aspect of prevention or treatment of HIV infection in a developing country setting (although almost certainly there are some which failed to come to our notice). This can be traced, in part, to the general low level of knowledge about what prevents a case of HIV; other than blood screening and control measures in a medical setting, little is known about the effectiveness of interventions to stop the spread of HIV. How many radio advertisements will produce the use of a condom during one sexual exposure? No one knows. How effective is counselling in preventing spread from known HIV-positives to their partners? Again, no one knows. How cost-effective is home care when compared with hospital treatment? The data are only now becoming available; the analysis remains to be done. What socioeconomic options are available to mitigate the effects of an AIDS death on a family so that the development gains of the past decades are not wiped out overnight?

During the course of this review we have encountered examples of the misuse of the power of economics. Many spurious arguments, which are in fact founded in stigma and discrimination against at-risk groups or persons who practise risky behaviours, look stronger when a judicious sprinkling of "cost-effectiveness" or other tools from the arsenal of economics (especially outrageous treatment costs) are added. Examples are: "It is expensive to treat AIDS, so we will exclude HIV-positive persons from our country just in case they fall ill." Or, "since it is so much more expensive to treat AIDS than to treat diarrhoea or malaria, we will not treat AIDS." There is no way to prevent this from taking place, but economists who provide the raw materials need to be aware of the use to which their results may be put.

Although medical ethics and human rights are not the subject of this paper, we thought that many readers would be interested in the subject as related to AIDS and HIV infection, so we

have included several references which cover this subject very well. Hausermann (ref 68) wrote a report commissioned by the Commonwealth Secretariat which presents a detailed overview of the most important ethics and human rights issues posed by AIDS and HIV, and argues convincingly that there need not be a conflict between human rights and public health. Bayer (ref 11) reviews issues of AIDS and public health and makes reference to the situation in the developing countries. Walters (ref 164) confines his article to a consideration of the ethics of treatment and prevention of HIV. And Drummond and Davies (ref 48) address some of the ethical issues, especially those surrounding treatment and resource allocation, from an economic point of view.

CHAPTER 2

WHO IS AT RISK FROM HIV INFECTION? HOW MANY WILL BECOME ILL?

The epidemiology of AIDS

The implications of the HIV epidemic will depend on two crucial factors: how many people fall ill, and who is most affected in any given society. Understanding the economic implications also requires an understanding of the natural history of HIV infection; an infected person can remain asymptomatic but infectious for a number of years, then begin to develop symptoms: AIDS itself is the final stage of HIV infection. The economist, therefore, must rely heavily on medicine, epidemiology and demography for answers to these questions. It is important to map out what Mead Over has termed the "economic epidemiology" of AIDS. In the years since the epidemic first came to international attention, great progress has been made in determining the epidemiological parameters, in particular as they relate to specific groups such as women and children, although there has been and continues to be considerable uncertainty and sometimes even conflict about the epidemiological picture.

WHO has invested considerable resources in gathering and analysing epidemiological data, and the work of Dr James Chin and associates is updated regularly. Only the most recent epidemiological work has been included here. Recent projections by Chin, Sato, and Mann (ref 33) of HIV infections and AIDS cases to the year 2000 reveal that whereas about 1 million AIDS cases have occurred up until 1990, the number will reach over 5 million in the decade of the 1990s. Most of these cases will occur in people who became infected before 1989 and therefore cannot be prevented by interventions recently undertaken. Estimates of new infections range from 6 to 12 million; the lower figure would be the result of effective prevention and control programmes. Another recent article by Chin (ref 31) reviews the situation with regard to women and children; WHO estimates are that 2.5 million women have HIV infection; by 1992 the number will reach 4 million. AIDS in the developing world is often thought of in terms of Africa; yet WHO has recently projected that by the year 2000 one quarter of cases will be in Asia, especially India.

A correspondence between Alexander Langmuir (ref 90), formerly chief epidemiologist of the US Centers for Disease Control (CDC) and Dr Chin (ref 30) about the projected number of AIDS cases in the US points out the difficulty of making epidemiological projections even with the relatively solid basis of information available in the United States.

Piot and colleagues (ref 127) describe the three patterns of HIV infection. De Cock and colleagues (ref 43) describe the very rapid increase in HIV infection and AIDS cases in Ivory Coast, where AIDS was only recognized in 1985; their information shows how quickly the virus can spread throughout a community. Similarly, Smith (ref 147) describes the rapid spread of HIV in Thailand, where it was first identified among male prostitutes, then in drug users, then in female prostitutes, and finally to the general population. In 1986 only 10 people were reported to be HIV-positive, but by 1988 more than 5000 people were HIV-positive. Melbye et al (ref 105) in their study in Lusaka, Zambia, reported that sexual activity was a risk factor, and that the better educated were more likely to be infected. This study showed a peak of infection among men at 30-35 and among women between 20-25. In Rwanda, Van de Perre and colleagues (refs 158 and 159) in two articles review the situation in both urban and rural areas, and for rural areas they report an association with previous sexually transmitted disease (STDs) and with travel to urban areas.

Of those who are infected with HIV, how many will go on to become ill, and within what time span? The natural history of HIV infection in developing countries is not as clearly defined as in the developed world. While it is known that 40% of seropositive haemophiliac patients in the UK had developed symptoms after 9 years (and by implication, around 60% remained symptom-free), it is not yet known whether the same or a similar situation will hold true for people with HIV in the developing world. Carael and Piot (ref 23) report that in two prospective cohort studies in Zaire and Kenya, progression rates were similar to those reported in Europe and North America; of 298 HIV-positive female prostitutes in Nairobi followed for two years, progression to severe illness occurred in 5.7%, and 47% had developed persistent generalized lymphadenopathy, one of the early symptoms of HIV disease. It is expected that results of natural history studies now being carried out (in Zimbabwe and elsewhere) will soon become available.

The demographic impact of HIV remains controversial, with much of the published work comprised of that by Anderson and colleagues based at Imperial College, London (refs 3, 4, and 133), and alternative scenarios by John Bongaarts of Population Council (ref 17) and Randy Bulatao of the World Bank (refs 19, 20). The discussion is of tremendous importance for economics, since the impact on society and on the economy will depend crucially on who is affected and in what numbers. One of the most accessible discussions of the various models, their assumptions, and the resulting implications is presented in Becker (ref 14). He observes that the disease will particularly victimize women; and that "while all of the projections indicate that hundreds of thousands of deaths will occur from AIDS, even the highest mortality projections do not give rise to depopulation." However, the number of

deaths expected – as many as 180,000 annually at the turn of the century in Uganda alone, with even more in Zaire – "can be thought of as the appearance of a disaster every year." Yet in an exhaustive review entitled "Economic consequences of population change in the Third World," by Allen Kelley (Economic Literature 988) the words "AIDS" or "HIV" do not appear even once.

Risky behaviour, risk factors and vulnerable groups

In the developing world, the population groups in which the highest rates of HIV infection have been found are different from those in the industrialized countries, where homosexual activity and drug use place persons at highest risk. The early literature includes references to groups which are at risk because they are highly mobile or living for long periods away from home (lorry drivers, miners, migrants, army and police); groups which are pushed by economic circumstances to exchange sex for money or food, including "prostitutes" and other sex workers; professionals and highly educated, high-income groups; and health workers. Later articles point out that there are no special "risk groups" in developing countries where the major route of infection is vaginal heterosexual intercourse, and where every sexually active person is at risk. (Ngaly et al, ref 112, and Goodgame, ref 59). However, many of the articles reviewed here addressed certain groups for risk factors. Although such categorization is becoming less appropriate, it makes more sense to review these existing articles according to the groups addressed.

i. Health workers

Investigations of the risk to hospital workers or to health workers has failed to establish that they are at higher risk of contracting HIV infection. Transmission from seropositive patients or from laboratory exposure to health workers has been documented and the risk of seroconversion from a needlestick injury with HIV-positive blood is estimated to be less than 1% (Marcus et al, ref 103). This review article concludes that "the prevalence of HIV-1 infection in health workers was not related to the degree of patient, blood, or needle contact and was considered to reflect the background rate of infection in the community." In one of the studies referred to by Marcus et al, Mann et al (ref 102) found in a study of 2,384 hospital workers in Kinshasa that seropositivity was associated with single status, blood transfusions, medical injections, or hospitalization within the past 10 years, but not with type of work (medical, administrative, or manual) or with patient contact or exposure to blood. N'galy et al (ref 113) report on a follow-up of the same group of hospital workers in 1986; overall seroprevalence among the workers had increased from 6.4% to 8.7%, and was highest among those under 30. Nearly 17% of the women under 30 were seropositive; and although nurses

had a higher rate of infection, this was explained by their younger average age. Van de Perre et al (ref 158) compared a group of male factory workers with a group of health workers in Kigali, Rwanda and found there was no statistical difference between the groups; STDs and blood transfusions were the identifiable risks for HIV-positivity. Occupational exposure could not be considered a major mode of transmission. Despite this evidence, however, Medvedev (ref 104) reports that Soviet doctors working with AIDS patients receive a 60% salary supplement, although in the USSR there is much more evidence of transmission of infection to patients in the medical setting, through inadequate infection control measures, than of patients infecting doctors or other staff.

Two categories of health staff would appear to be at greater risk than the "average" health care worker. These include surgeons, and traditional practitioners, especially traditional birth attendants, who are presumably exposed to large quantities of potentially infective blood and body fluids. But whereas surgeons are generally well protected and informed about infection control, in the traditional sector workers have little or no protective equipment or even education. No article was found which assessed this risk, or pointed to possible measures to mitigate the risk.

ii. Mobile population groups

Mobile people (those who travel or frequently change their place of residence) seem to be at higher risk of contracting HIV. The literature contains references to several mobile groups: migrants, miners, lorry drivers, and tourists. Army and police are often posted away from home and in some countries are reported to have very high rates of seropositivity (60% or more), but for a variety of reasons countries are reluctant to release information. Refugees are another major group present particularly in Africa who are mobile. The United Nations High Commissioner for Refugees (UNHCR, ref 156) has prepared a policy statement pointing out that refugees, although displaced, are no more at risk of infection than the host population in any country of refuge. They are, however, particularly vulnerable to measures taken to screen non-nationals for HIV infection before allowing immigration, since refugees have no country of origin to return to. UNHCR calls for HIV prevention measures for refugees as for host populations, and also points out that any measures which suggest that the refugee population is at higher risk than others should be avoided. The question of refugees is also taken up by Wallace (ref 163), who calls for all agencies involved with refugees to work together in ensuring that prevention programmes are taken into refugee camps as they are for the host population, and reiterates that refugees are not at greater risk because of their refugee status.

Lorry drivers are perhaps the most highly mobile population one could imagine. A study of the prevalence of HIV-1 among 68 east African lorry drivers published in 1989 (Carswell et al, ref 28) found that 40% of drivers and 26% of their assistants ("turnboys") were HIV-positive. A further 10% were found to be positive with a different test (antigen detection system). 36.7% of the drivers and turnboys admitted more than 50 lifetime partners, but there was no difference between the seropositive and the seronegative groups with respect to number of partners. Drivers were older than turnboys.

With regard to migrants, Hunt (ref 77) argues that the pattern of HIV disease in Africa must be understood in relation to the patterns of migrant labour, which means long separation from families; STDs were widespread before AIDS was known in Africa. In a different article, Hunt (ref 76) argues more strongly that the migrant labour system caused a breakdown in family and sexual relationships, and the takeover of the African agricultural system by capital added a "push" element to the "pull" effect of employment in the cities. Whiteside (ref 168), at the Global Impact of AIDS Conference held in 1988, noted that women are in contact with the migrant workers in various capacities, as prostitutes or sex workers, as casual lovers, and as long term partners or wives.

In 1987, Cardenas-Elizalde (ref 25) studied a group of 35 Mexican AIDS patients who had been living without documentation in the US and compared them with a group of "undocumented" immigrants to the US. The conclusion was that the AIDS patients were a different group from the general population of undocumented immigrants; they were older, did not originate from the areas of Mexico from which immigrants traditionally come; they were single and did not work in manufacturing, agriculture, or mining as did the majority of immigrants. Most declared themselves to be homosexual or bisexual.

Many of the migrant labourers, especially in southern Africa, are employed as miners; another publication by Whiteside (ref 167) published in 1990 describes the recent events with Malawian migrant labourers working as miners in South Africa. When South Africa began to test migrant mine labourers, it was found that Malawian miners had a higher rate of seropositivity than did workers from other countries. This led to a ruling that all Malawian miners should be tested; and by 1988 the level of positivity had risen to 10% (from 3.7% in 1986). At this point, according to the Chamber of Mines of South Africa, the Malawi government declared that it was not prepared to allow only Malawian citizens to be tested; and all mine recruitment ceased. The Malawi government, however, stated that the reason mine recruitment stopped was that men were needed to work the land. The loss of foreign exchange from miners' remittances is considerable. In Zambia, most of the mine employees

are Zambian, and in 1986 testing had shown that HIV is widespread in the Copperbelt where the copper mines are located. More recently, Nkowane (ref 117) and Desmond (ref 44) pointed out that professionals and skilled workers in the mining sector were particularly affected by HIV. Linhares and Mello (ref 95) found in Brazil that although none of the sera collected from gold miners in 1983 and tested for HIV in 1989 were positive, conditions (promiscuity, prostitution, and homosexuality in the community) were right for such mining communities to serve as "distribution centres" for HIV in the future.

iii. Drug users

Drug users in industrialized countries are at high risk of contracting HIV through use of shared injection equipment. Whereas injecting drug use is still rare in developing countries, it is not unknown. Reeler (ref 130) documents the widespread use of unofficial "medical" injections; there is no shortage of injection equipment in developing countries. Mann (ref 101) notes that there has been extensive spread of HIV among drug users in Thailand; and it has also been found in Rangoon, Myanmar (Burma) and Manipur in India (Naik et al, ref 111). Obot (ref 118) traces the evidence for increasing use of alcohol, cannabis, cocaine and heroin in Africa; use of cocaine and heroin is still limited in Africa but trafficking through Nigeria to Europe is substantial, with 65% of all heroin seized in British airports in 1986 coming from Nigeria. Pela and Platt (ref 124) note that heroin and cocaine addiction have been reported from Lagos and Benin City, but that there has been no study of the use of drugs in Africa related to the spread of HIV.

iv. Women

It has become clear in the past few years that HIV infection and AIDS are no longer primarily an affliction of men. Women are increasingly affected; an estimated one third of the 6 million estimated HIV-positive persons in the world are women (Mann, ref 100). But unfortunately there has been a tendency to transfer the stigma and label of promiscuity, originally applied to homosexual men who contracted HIV infection, to women, and to characterize the disease as one of prostitutes. The fact that transmission from man to woman is approximately three times more effective than from the woman to man means that for a given number of contacts a woman has a greater chance of becoming infected (Becker, ref 13; CDC AIDS Weekly 15 January 1990). A woman can be exposed to HIV sexually without being involved in prostitution or even without having more than one lifetime partner, as the wife of a man who is sexually active outside the marriage. But in addition, a woman faces other risks of contracting HIV and AIDS; a large percentage of transfusions are for post-partum bleeding and other complications of childbirth; they are exposed as carers; as midwives (both formal and traditional birth attendants). The reality especially as regards

COMMUNITY HEALTH C
LIBRARY
AND
DOCUMENTATION
UNIT

women, therefore, is complex. Caldwell et al (ref 21) describe the wide variation in social context in sub-Saharan Africa, and state: "The sub-Saharan African population is not a morally backsliding Eurasian population that can be returned by exhortation and educational campaigns to a pattern of sex occurring predominantly within marriage. Indeed, aggressive and badly targeted campaigns could severely undermine social institutions, hurting in particular the position of women and some of the most socially marginal groups." (ref 21, pp.224-5)

Many of the risky activities for a woman have an economic rationale, in particular, exchange of sex for food, money, or other necessities. Bledsoe (ref 16) shows the pressures on women which increase the risk of HIV transmission; first is that the marriage process is often lengthy and women may need to rely on men for economic support prior to marriage; this means exchange of sexual favours. There is also pressure to have children, and this may also lead to relationships with more than one partner; bearing children of more than one father may be economically advantageous as well. Finally, schoolgirls may exchange sexual favours for money for school fees; they may also be targets for the attention of male schoolteachers. This, coupled with the tendency for older men ("parked at schoolyard gates") to seek younger, "safer" girls has led to an increase of sexual activity on the part of schoolgirls. AIDS has led to distrust between sexual partners; women are often blamed and assumed to have been promiscuous even if they have been infected by their husband or other partner. Finally, use of condoms is a near impossibility for women who are dependent on the sexual relationship for economic reasons; they do not wish to endanger the relationship by asking the partner to use a condom.

Schneider (ref 135) points out that serial polygamy or "extraresidential liaisons" are a way of coping with poverty and, echoing Hunt and Whiteside above, that prostitution is an outgrowth of the migrant labour system. Motherhood is the most secure source of social and economic status. Schoepf (ref 136) points out that multiple partner strategies are a consequence of the economic crisis; and that education campaigns have failed to inform the public about the long incubation period of HIV infection. She points out the need to understand how the macro-level political economies affect sociocultural dynamics at a micro level, and the need to pay attention to "counter currents of resistance to dominant ideologies."

Carael and Piot (ref 23) reviewed HIV infection in developing countries, and point to prostitutes as a "reservoir" of HIV and STD infection. They mention the changes in sexual behaviour which accompanied urbanization; there are differences in patterns of behaviour in

different cities. Women who make a living as sex workers or "prostitutes" are not the homogeneous group often assumed. The market for prostitution is segmented; Kreiss et al (ref 89) carried out a study in 1986 of two groups of prostitutes in Nairobi. One was the lower socioeconomic group working in a poor area of Nairobi, the other was a group operating in the bar of a tourist hotel. The clients of the first group paid $0.50 per encounter, and the women had an average of 963 encounters per year. Of this group 66% were HIV-positive. The higher socioeconomic group charged $5 to $15 per encounter, and had an average of 124 encounters annually; 31% were HIV-positive. Neither group reported using barrier contraception. [The average incomes of these groups were therefore $481 for the poorer group, and $1,240 for the better-off group (if $10 is taken as the average charge). The lower socioeconomic group had almost eight times as many encounters as the higher socioeconomic group.] A group of men from a STD clinic were also interviewed, and they reported an average of 17 sexual partners in the previous year; 8% were HIV-positive.

In addition to the possibility of sexual transmission, women face additional risk of infection with HIV through two additional routes: through transfusion at childbirth or for anaemia due to malaria or other causes, and through exposure as carers, i.e. nurses, traditional birth attendants, or in other caring capacities. No articles reviewing this exposure were found, however.

v. Children

Children's exposure to HIV is usually linked with the HIV exposure of their mothers. The figure usually cited is that an HIV-positive woman has about a 25% chance of infecting her child before or during birth. Hira and colleagues (ref 74) in Zambia found, however, that about 40% of children born to HIV-positive mothers were positive. In either case, the impact of HIV on child mortality will be severe in areas where there is a high level of HIV infection among pregnant women. In a population with an under-five mortality rate of 100 per 1000, if 5% of pregnant women are HIV-positive, child mortality would rise by 9%; but if 20% of pregnant women are infected, child mortality rises by 36%. WHO estimates that during the 1980s, as many as 200,000 infants were perinatally infected with HIV. (Mann, ref 100) Several urban areas in sub-Saharan Africa now report HIV infection rates of the order of 25% or more among pregnant women. Preble (ref 128) estimated for ten east and central African countries that during the 1990s AIDS will kill 250,000-500,000 children annually. Valleroy et al (ref 157) used a mathematical projection model and seroprevalence data from six cities in the developing world, but mostly from Africa, and concluded that recent gains from child survival are likely to be reversed. In Uganda in 1992, it is estimated that between 10% and 30% of all under-five mortality will be due to HIV infection.

The children born of HIV-positive mothers who are not HIV-positive themselves face another set of problems: they are likely to become orphans. Preble (ref 128) examined data from 10 central and eastern African countries, and projected that AIDS will kill 1.5-2.9 million women, leaving 3.1-5.5 million orphans – between 6% and 11% of the total population under 15. AIDS orphans "will swamp all existing forms of long-term care". She examines four likely outcomes, including adoption by relatives; orphanages; abandonment; and death due to neglect. She calls for increased donor and government support for solutions to the problem of orphans. Hunter (ref 78) gives a troubling account of an enumeration of orphans by Save the Children Fund in several of the most heavily affected areas of Uganda. They face problems finding money for food, shelter, and school fees. In addition, she recounts the squabbling and lack of coordination between donor agencies and finds the political framework not conducive to finding a solution.

CHAPTER 3

PREVENTION AND CONTROL: THE EFFECTIVENESS OF INTERVENTIONS

The HIV is transmitted through three principal routes: through sexual contact, through blood and other body fluids, and vertically from mother to child. Various interventions are possible to stop or slow transmission through these various routes. Our intention was to review available evidence from the developing world on two questions:

1) How effective are the available interventions?

2) How much will it cost to slow the spread of infection?

This chapter reviews the literature on those interventions. In view of the very significant expenditures being made on preventing and controlling AIDS (WHO alone is spending nearly $100 million annually), we had expected to find a body of literature on the cost-effectiveness of prevention measures, but we found virtually no such literature. What we did find was several articles which would be useful to someone setting out to do an economic evaluation of prevention and control. As the literature on costs is very thin, especially from developing countries, we have included a few articles from the industrialized world especially where the methods used could lend themselves to use in developing country settings.

Several review articles have been written which bring together the literature on prevention of transmission through a variety of routes. In particular, the article by Doris Schopper (ref 137) reviews the state of the art of interventions in developing countries, including the mass media, STD treatment, blood screening, etc. This is a very useful paper with 73 references. A complementary review of the evidence on behaviour change in the US and UK was produced by Becker and Joseph (ref 14). Both point out the lack of clear evidence on effectiveness of interventions and Schopper in particular notes areas of research which have been neglected, i.e. maternal transmission, the impact of treatment of STDs, and transmission in the health care setting. Neither article was able to uncover any significant literature which brings in the element of cost.

Another general review article is that of Standaert (ref 148); drawing on experience from Burundi, he discusses the different methods of economic evaluation available, in particular cost-benefit and cost-effectiveness analysis, and rejects them in favour of "multi-attribute problem analysis." He was able to cost some of the interventions, in particular the

information campaign and blood screening; but was unable to complete the analysis in terms of effectiveness because of the data limitations. An article from Australia by Lloyd (ref 96) reviews some novel approaches to interventions: since education does not produce the desired behaviour change in all those who may infect others, two possibilities arise: one is the threat of legal sanctions against persons who put others at risk; and the second is to pay persons to change their behaviour. This would include, for example, needle and syringe exchange schemes, distribution of free condoms; paying persons who agree not to have sex, i.e. prostitutes; bonuses for drug users who agree to stop taking drugs. Bulatao and Bos (ref 20) modelled the impact of several control measures (vaccine development and distribution, blood screening, provision of sterilized needles, STD control, and information and education). Changes in sexual behaviour have the most significant impact on HIV spread, with other changes or interventions having a smaller impact. They fail to take account of the fact, however, that the relationship between an intervention to prevent transmission in the medical setting has a much more direct and quantifiable relationship to the output of a case prevented than does an intervention designed to change sexual behaviour. For example if seroprevalence among blood donors is 25%, the number of cases prevented by screening blood can be estimated with some precision, whereas the number of sexual contacts protected by a condom produced by a radio campaign is difficult to determine with any precision, and indeed, may be difficult to achieve.

Ankrah (ref 6) argues that the prevention and control of AIDS must take account of the sociocultural setting, including the belief systems about death, sickness and disease. Governments have, in some cases, launched prevention programmes without looking first at the relevant sociocultural factors. Risky behaviour, she argues, is closely linked with poverty and social deprivation.

Interventions to reduce transmission by sexual contact

A few articles have been written on interventions specifically designed to change sexual behaviour or otherwise reduce sexual transmission. Ngugi et al (ref 115) reviewed the effectiveness of condom promotion among prostitutes in Nairobi and found that an education programme combined with a condom distribution programme resulted in most women reporting some condom use following the intervention. Wilson et al (ref 170) working with commercial sex workers in Bulawayo, Zimbabwe, found that a major problem was client resistance to the use of condoms, and pointed to the need for client education as well as education for commercial sex workers.

More radical and controversial approaches have been tried, however. Bayer and Healton (ref 12) visited Cuba where a large proportion of the population was tested for HIV; those who tested positive have been quarantined. Screening was done using locally produced tests which have not been validated against international standards. Screening began with foreigners (including students) and Cubans who had been abroad (soldiers, advisers). A total of 259 Cubans found to be infected with HIV were identified, as well as 140 students. The authors estimate that between 21 and 53 people whose test results were false positives are now in quarantine. The government pays them a salary and provides accommodation. The loss of their output to the economy was not calculated, nor were the intangible costs of loss of liberty, contact with family and friends, or the overall impact of the denial of human rights of some members on the community as a whole.

Another approach was instituted in the state of Illinois in the US, where an HIV test was required for persons intending to get married. Turnock and Kelly (ref 154) report that the result was that many persons chose to get married in neighbouring states; that the likelihood of false positives was extremely high given the very low underlying prevalence; and that the high cost of the test (from $12-84 for the test, plus the physician's office fee of up to $150) appeared to be discouraging low-income persons from getting married. The programme identified eight seropositive persons (five of whom reported a risk factor) and cost $2.5 million or $312,000 per infected person identified. This amount was 1.5 times the state's expenditure for all other AIDS surveillance and prevention programmes. The intangible costs of having a false positive result were impossible to calculate. The initiative was considered to be a failure.

Montoya Thompson (ref 108) uses economic theory to decide whether or not testing for HIV is justified, and whether confidentiality of the result is justified. She argues that *laissez faire* should not prevail in the private market supply of HIV tests, and further argues that confidentiality allows a tested carrier to "imitate" untested persons, which is economically inefficient; the decision to breach confidentiality should be turned over to the HIV carrier's "knowledgeable, public-spirited doctor" who makes the decision as to whether confidentiality should be maintained. This somewhat academic article makes several recommendations which, while possibly well grounded in economic and legal theory, in all likelihood would pose numerous legal, economic and human rights problems if they were to be implemented.

Border controls have been instituted in a variety of countries; Duckett and Orkin (ref 49) carried out a survey in 1989, approaching government representatives of 166 states, and

found that there were HIV-related restrictions for one or more classes of entrants in 50 countries. The paper includes a list of all the restrictions found to be in force at that time. Gilmore et al (ref 57) point out that screening is ineffective in preventing the spread of AIDS, and that it diverts attention from national prevention efforts and therefore facilitates the spread of HIV. HIV testing may also reduce business and commerce because of the nuisance and cost of repeated testing to enter a country.

Gostin and colleagues (ref 60), writing in the *New England Journal of Medicine* on the evidence for and against the United States' programme for screening of immigrants and international travellers, concluded that they are unjustified unless the persons thereby excluded "posed a danger to the community through casual transmission." They acknowledge that treating patients infected with HIV who immigrate to the US will incur costs, but conclude that it is inequitable to use cost as a reason to exclude HIV-seropositive people since there are no such exclusions for people with other costly diseases, such as heart disease or cancer. In a reply to Gostin et al (ref 106), Bernard Meyer, a doctor working for the US Embassy in Dakar, Senegal estimated that approximately 1,354 persons had been denied visas on the basis of HIV-seropositivity. Using medical care cost figures available for the US, Meyer estimated that the "health care burden" of these people would have been between $81 m and $108 m. In their reply, Gostin et al (ref 61) pointed out that they were excluded irrespective of their ability to pay; and that the list of exclusions "should give us pause to consider the tolerance and humanity of US immigration policy."

Over and Piot (ref 122) have prepared a chapter for a longer book on priorities for adult health interventions to be produced at the World Bank. They reviewed HIV infection and other sexually transmitted diseases (STDs). A basic assumption is that there is a core of 2% of the population who are highly sexually active, and that targeting interventions at this core group is highly cost-effective. [This assumption, however, is questionable and contradicts the assertions of other authors (Ngaly et al, Goodgame) that there are no "risk groups" *per se* for HIV infection in African countries.] They calculated the cost of providing condoms to everyone who is HIV-positive in seven African countries; the cost would be between 15% and 34% of the total Medium Term Plan (MTP) budget for AIDS control and prevention. Another intervention would be to provide income generation opportunities for women; Nigerian women said they would cease prostitution if given a job paying the equivalent of $15 per month. Urban employment opportunities might reduce the supply and therefore raise the cost of commercial sex. [It is also possible that prostitution is demand-led, and that more women would be drawn to prostitution as the price increased.] This report also includes an estimate of the cost of prevention activities; average costs range from $4 per "couple year" to

$20, or $8 per discounted year of healthy life lost if directed at a "core" person and $50 if directed at a "non-core" person. This analysis is highly dependent on the assumption that the small "core" of highly sexually active persons does in fact exist; and that it is limited to 2% of the population.

Interventions to prevent transmission through blood or other body fluids, and in a health care setting

A number of articles on blood screening have appeared, reviewing the cost-benefit ratio of blood screening under various circumstances. In Japan, with a very low seroprevalence, Ohi et al (ref 119) found that generalized screening of blood produces a negative benefit:cost ratio; the rationale for implementing large scale donor screening is primarily to eliminate fear in transfusion recipients and in the population at large. The situation in the US is different; Eisenstadt and Getzen (ref 52) found that benefits exceeded costs by a ratio of 1.2:1. Substituting available estimates and data from Africa, however, into Eisenstadt and Getzen's calculations results in a benefit:cost ratio as high as 54:1 in a case where seroprevalence in blood donors is taken to be 18%, and donors are not informed and therefore costs of follow-up and counselling are not included. In Uganda, with a very high underlying prevalence in blood donors, emphasis has been placed on selection of low-risk donors; volunteer donors have a lower seroprevalence (9-10%) than do relatives (15-22%) (Watson-Williams et al, ref 165). Sepulveda (ref 142) reviews the situation in Mexico and reports that 12% of the 1,628 AIDS cases reported as of August 1988 were ascribed to blood, of which 79% were through transfusions. This was associated with a high prevalence of 7% of HIV infection among paid donors. Further investigation suggested that donors were being infected at the blood bank. Screening was introduced and other measures were instituted,which included prohibition of the sale of blood; promotion of volunteer blood donation campaigns; and production of guidelines for appropriate indications for blood transfusion. The article concludes that screening of all transfusions "will, in all cases, be less expensive than the eventual hospitalization of patients." No cost data are presented to support this statement, however.

HIV infection in the Soviet Union was largely ascribed to hospital procedure (Medvedev, ref 104), in particular to the use of unsterile needles and syringes, as has the increasing incidence in hepatitis B (from 13.5 per 100,000 in 1974 to 40.2 in 1987). The USSR produced only 3% of its annual requirement of disposable syringes, and only 3 condoms per male adult.

Transmission in the health care setting is also possible from patient to health provider and from patient to patient, and most hospitals in industrialized countries have now instituted

"universal precautions." Stock et al (ref 151) carried out a cost-effectiveness analysis of universal precautions in a Canadian teaching hospital where underlying seroprevalence in the patient population is less than 1%, and found that the cost per case of seroconversion prevented among health workers was US$8 million. They do point out, however, that their results could not be generalized to other hospitals; a sensitivity analysis carried out using a 10% seroprevalence produced a cost per seroconversion prevented of $830,000. Over half of their costs went to impervious gowns, which are rarely seen in developing country hospitals.

Maternal transmission

As noted above in chapter 2, section v, there are various estimates for the percentage of children born to HIV-seropositive women who will go on to develop HIV infection. Nicol et al (ref 116) reviewed the evidence for transmission of HIV through breast milk. While it cannot be claimed that transmission through breastfeeding never takes place, they have calculated that the increased infant deaths which would take place due to artificial feeding far outweigh the risks of transmission to children of HIV-positive mothers through breastfeeding. They recommend increased promotion of breastfeeding to counteract the possible change in practice if the fear of transmission through breastfeeding becomes widespread in developing countries.

CHAPTER 4

WHAT WILL TREATMENT COST, AND WHO WILL PAY?

The majority of the economic work which has been done to date has focused on the direct personal medical costs of treating AIDS and HIV. Early estimates were made and much of the subsequent effort has gone into refining those estimates and broadening them to include other costs as the full economic impact of the epidemic begins to be appreciated. To date, however, there has not been a great deal of attention paid to the impact of treatment, to whether the patient's quality of life is improved by treatment, the impact (including economic and financial) of treatment on his or her family, or the costs of treating AIDS in comparison with other similar diseases. This chapter will review the literature from both high-income and low-income countries on what the treatment of HIV and AIDS costs in various settings, what methods are available to estimate costs on the basis of available data, and who will pay for care?

Evidence from the high-income countries

The earliest and still some of the most comprehensive work on the costs of care for AIDS and HIV was done by Scitovsky and Rice (ref 139, 140) who reported on the situation in the United States in 1987, on the basis of 1985 and 1986 data. They estimated three main types of cost: 1) direct personal medical care costs, i.e. care in hospital, drug costs, etc.; 2) non-personal medical costs, including research, blood screening, health education and support services and; 3) indirect costs, i.e. loss of income due to morbidity and mortality. They are still virtually alone in having attempted to cost non-personal medical costs; and their estimates reveal the need to pay attention to these costs in order to obtain an accurate picture of the overall costs of HIV. Non-personal direct costs accounted for about a third of direct costs for AIDS in 1985 and 1986; yet these are often omitted from cost estimates. They also estimated the indirect costs due to mortality and morbidity using the human capital approach, on the assumption that AIDS patients had the same average earnings as others of their age and sex. Compared to other diseases, AIDS costs more to treat than any other diseases with which they made comparisons except end-stage renal disease. Of the AIDS-related presentations, P. carinii pneumonia (PCP) was more expensive to treat than Kaposi's sarcoma. They pointed out, however, the limitations of their assumptions, in particular, the Centers for Disease Control (CDC) prevalence estimates may change; the diagnostic groups may change; the medical treatment may change; and the age and sex patterns of AIDS patients, and their resulting wage patterns may change over time.

COMMUNITY HEALTH CELL
LIBRARY
AND
DOCUMENTATION
UNIT

Hellinger in 1988 (ref 71) has projected personal medical care costs of AIDS (asymptomatic or HIV-positive persons in earlier stages of HIV infection are not included) using data from the insurance industry in California, and examines the basis for earlier estimates. He concluded that the average cost of care was $60,000, of which $50,000 was paid by insurers, $5,000 for medical expenses excluded by insurers, and $5,000 for AZT. By 1990, however, Hellinger had revised this figure to $75,000 (ref 72). He predicts that this will continue to rise as survival increases and the use of expensive drugs continues to spread. For example, treatment of asymptomatic people with aerosolized pentamidine and AZT will increase costs by as much as $5.4 billion if care and counselling are included.

Many of the limitations mentioned by Scitovsky and Rice, namely, changes in prevalence estimates, diagnostic groups, medical treatment, and the age and sex patterns of AIDS patients and resulting wage patterns have subsequently proven to be applicable. For example, as pointed out by Hellinger and others, medical treatment has already changed considerably. Arno et al (ref 7, 8) have reviewed the economic impact of early intervention in AIDS and HIV disease, which has become more common. AIDS and HIV disease will soon come to be treated as a chronic illness treated on an outpatient basis, rather than a fulminant illness treated intensively in hospital; the lower costs of outpatient care will be largely offset by the fact that people will live longer. Drugs which are paid for largely out of pocket, especially zidovudine (AZT),[a] will be affordable by only a few.

Hellinger also points out in the 1990 paper (ref 72) that a larger proportion of cases of IV drug users has been reported since the revision of the definition of AIDS. This is of interest for two reasons: the presentation of AIDS is different (with more PCP than in homosexual patients) and they are often unemployed and uninsured, and therefore costs of their treatment are borne largely by publicly funded hospitals or programmes. He makes the point that patient-based studies are essential, since studies based on insurance claims exclude many costs, and is overseeing a major eight-centre patient-based study which is being carried out in the US but no details were made available in response to our request.

Caplan (ref 22) reviews the costs of care provided to IV drug users (IVDU) in New Jersey. He points out that they are usually sicker at diagnosis and have PCP rather than Kaposi's sarcoma; and they are dependent on public health insurance. The reluctance of some doctors to treat them has meant that they are treated in hospital emergency rooms, where care is most expensive; they are refused care at private hospitals and are being dumped on inner city public hospitals, which are placed in financial jeopardy.

---

a AZT is the generic name originally given to the drug now called zidovudine. Retrovir is its trade name.

02922
DC 3A5
COMMUNITY HEALTH C
LIBRARY
AND

Who will pay for the care of AIDS patients? The AIDS epidemic has brought into sharp focus the major problem of the American health system: the lack of a universal health insurance system and coverage. Many AIDS patients have no health insurance, yet are not poor enough to qualify for Medicaid (in 34 states eligibility is below 50% of the poverty level). Iglehart and colleagues (ref 79, 80) also raise the issue of who pays, and report how private insurers are increasingly finding ways of excluding people with AIDS. Makadon et al (ref 99) review several options, including expansion of Medicaid and Medicare. Arno (ref 7) states that AIDS "highlights the tragic flaws in the health care system of the country" and optimistically concludes that it may eventually provide the basis for a system of cost sharing rather than "cost-shifting."

In Europe, where many countries have achieved near universal coverage through national health insurance, the issue is not so much who will pay as what share of the national health resources should be devoted to care of terminally ill AIDS patients. Drummond and Davies (ref 48) have reviewed the issues surrounding the treatment of AIDS with particular reference to Europe. They have attempted to find out why the cost estimates vary so widely, and how changes in treatment patterns will affect costs. They have also made important observations about the economic arguments for and against treatment. With regard to differences in treatment costs, they conclude that different studies have included different costs and have used different methods of reporting; the definition of AIDS varies; the patient mix (IV drug users or homosexual/bisexual men) varies; and the type of opportunistic infection has an influence. They also conclude, like Scitovsky and Rice above, that costs of treating AIDS are comparable to those of other severe medical conditions such as terminal cancer or chronic renal failure; they make the important point that comparisons of quality of life added should be made in comparison with other end-stage diseases. They also point out that society feels an obligation to look after terminally ill persons.

A carefully reasoned paper from the Centre for Health Economics of the University of York by Eastwood and Maynard (ref 50) compared Quality Adjusted Life Years (QALYs) produced by treatment of AIDS and other diseases and found that the cost per QALY of treating AIDS (£20,805) was higher than that of other diseases. They ask the question, "if it is inefficient to treat AIDS patients, is it ethical not to?" They then take the analysis a step further: "if ethics are equated to NHS [National Health Service] utilitarianism, then it is ethical not to treat AIDS patients." This is a strong conclusion, especially one made on the basis of what are – at best – limited, partial, and inexact data on the costs of treating AIDS.

Drummond in another paper (ref 47) reviewed information presented at the 1989 Montreal

AIDS conference on costs of care and points out that progress is being made in refining cost estimates and in finding out the reasons for the widely different estimates.

The methods used in costing the care and treatment of AIDS vary widely, with consequent wide variations in costs. In this section we will review the methods briefly, with a view to their potential applicability in low-income countries. Many of the methods used depend heavily on detailed data from insurers or from public funding agencies or hospitals; these are usually not available in low-income countries and are therefore of limited applicability. Thompson and Meyer (ref 153) review methods used in costing AIDS, including the use of QALYs. Bilheimer (ref 15) describes a "pragmatic approach" using a microcomputer-based model for use in the US at federal, state, and local levels. Hay (ref 69) reviews the use of econometrics, and concludes that (even in the US) most of the standard theoretical and statistical models are not applicable because of the scarcity, incompleteness, and non-representative nature of the available data.

An article by Hay, Osmond and Jacobson (ref 70) presents possibly the most interesting and useful methodology available from the viewpoint of low-income countries. They used medical decision algorithms for each of the major AIDS-related conditions, applied to current seroprevalence and most recent data on rates of progression to AIDS. They calculated average treatment costs for the most common HIV-related conditions, and from that were able to calculate an average medical care cost estimate. The findings for selected complications are presented below in Table 1.

Table 1. Average medical costs per patient for selected AIDS-related diseases in the United States

Type of complication	Average frequency of event	Per case cost	Weighted share of expected cost	Percent of total cost
Herpes simplex	0.25	$196	$49	0.2%
Diarrhoea	0.64	$469	$300	0.9%
Oral candida	0.50	$1,396	$698	2.1%
Cytomegalovirus	0.07	$14,719	$1,089	3.3%
Kaposi's sarcoma	0.30	$5,902	$1,171	5.4%
Neurologic complications	0.53	$7,103	$3,765	11.6%
Anaemia and AZT therapy	0.70	$13,082	$9,157	28.1%
P. carinii pneumonia	1.02	$13,737	$14,012	43.0%

Source: Hay, Osmond, and Jacobson, 1988.

The value of this approach for low-income countries is twofold: not only does it assist in making an overall estimate of treatment costs, but it also points to conditions which deserve more intensive study, either because they are very common (e.g. PCP in the US and most likely tuberculosis in the low-income countries) or very costly to treat, such as cytomegalovirus (or Kaposi's sarcoma in low-income countries). The methodology described by Hay et al does not rely on extraneous data sets but rather on unit costs of hospital level services. It should be possible to use this method to establish not only overall costs of care but also costs of treating specific AIDS-related conditions, and to place them in the context of their importance for the overall cost of providing care.

Given the uncertainty as to costs of treatment even in the US and Europe, how useful is it to make cost estimates? In a thought-provoking piece, Peter West (ref 166) concludes that there is little point in making such estimates; and that they are not worth having in view of: 1) the uncertainty as to the number of cases; 2) the inclusion of very high drug costs, which are likely to fall, in the estimates; 3) the lack of knowledge about the services to be provided and; 4) the fact that emphasizing costs may prove counterproductive. This last point is especially important; "if we continue to emphasize the cost of AIDS we may put it more strongly under scrutiny from the many people who see themselves at no risk of acquiring the disease." Indeed, in the state of Oregon in the US, people asked to decide how to allocate limited state funds for health put newly born severely handicapped babies and people with full-blown AIDS low on their list ("A price tag on life and death", The Independent, 4 December 1990). It could be argued that the paper by Eastwood and Maynard referred to above, which asks whether it is ethical not to treat AIDS patients in view of the high cost per QALY in comparison with other conditions, falls into this category , since society is unlikely to choose only to allocate funds for care of conditions with an acceptable value per QALY. Lo and colleagues (ref 97), from the United States, note that "it is difficult to justify restricting the care of patients with AIDS for economic reasons unless society is also willing to restrict the care of other patients with similar prognoses."

Evidence from the low-income countries

Researchers and economists working in low-income countries with vastly less data but (it might be argued) on a vastly more important health problem, have been much more modest in their estimates and predictions. Scitovsky and Over (ref 138) present a comparison of the methods for use in high-income and low-income countries, discussing issues such as the difference between normative (best practice) and positive care (what actually is provided);

prospective vs. retrospective samples, and the use of random vs. convenience samples. Another issue is the difference between charges (i.e. what is billed or reimbursed by an insurance company) and actual costs; in high-income countries both may be available, but in developing countries neither is likely to be widely available, and the researcher must generate the data him or herself. A further complication is the exchange rate, which may be changing rapidly; ideally the purchasing power parity rate would be used to calculate costs but these are infrequently calculated for developing countries. The article also summarizes results of some of the first work on costing of AIDS in low-income countries. One major caveat is that the work reported does not include costs of people who are HIV-positive but who do not have AIDS *per se*; work from several African countries shows that even at hospital level, the definition of AIDS picks up only half of the HIV-positive persons in the hospital. Such studies therefore seriously underestimate the burden of HIV-disease on a hospital or health service.

Lewis et al (ref 94) give an overview of the cost issues of AIDS in developing countries and briefly review most of the work available at time of writing (1989). They point out the problems in using anything other than actual records for costing; but acknowledge the difficulty in Africa of using actual records, as hospital records may be incomplete and hospital care is available only to a small proportion of the population. Over et al (ref 121) give guidelines for the "rapid estimation" of both direct (medical) and indirect costs for use where time is scarce; more attention is devoted to the calculation of indirect costs. It is unclear, however, that this method can give useful results for estimation of direct medical care costs.

Some of the earliest work from low-income countries was presented at the 1988 Global Impact of AIDS conference held in London; Griffiths (ref 65) listed the data needed for cost estimates, and proposed the use of simple models using reliable if limited data. He suggested that in the high-income countries the costs were high but sustainable, while in low-income countries the cost of caring for AIDS patients cannot be met. Griffiths projected costs of care on the basis of a ratio of GNP; and his projections for Tanzania and Zaire are roughly in line with those described by Over (ref 120), one of the other papers on cost presented in London. Over found for Tanzania that the direct medical care costs ranged from $104 to $631, and for Zaire, from $132 to $1585, with the variations depending on the source of care, not the outcome of treatment.

More recently, Chela et al (ref 29) have costed clinical care in rural Zambia; some of their findings are presented overleaf in Table 2.

Table 2. Comparison of drug costs for HIV+ and HIV– patients in a rural African district

Type of patient	Average length of stay (days)	Drug cost per day (US$)	Total average drug cost (US$)
Hospital-based care:			
HIV–, Tb–	11	0.76	8.34
HIV+, Tb–	17	1.45	24.07
HIV+, Tb+	62	0.55	33.90
Home care:			
HIV+ †	12 months	NA	5.96

† Patients suspected of having Tb are admitted to hospital for further investigation.

Source: Derived from Chela et al, 1989, Tables 6 and 7.

This is one of the first reports from Africa on costs of other than hospital level care, Chela et al found that home care was acceptable, both clinically and socially, and less expensive. They found that treatment of HIV-positive patients was more costly than HIV-negative patients. They also found that treatment of HIV-positive patients with tuberculosis was more costly than care of HIV-positive patients who did not have Tb, thereby reinforcing the preliminary assessment (Foster, ref 55) that treatment of Tb will be a major component in the overall cost of care of HIV-positive patients, and that efforts to seek more cost-effective ways to treat or prevent Tb should be pursued.

The most recent cost study from Africa also appears to be one of the best. Hassig et al (ref 67) report on a series of 251 adult inpatients admitted to the medical wards of Mama Yemo Hospital in Kinshasa, Zaire. Half were HIV-positive; they were better educated, younger, and of a higher socioeconomic status than the HIV-negative patients. Data were collected prospectively on all expenditures for medications, food, procedures; and demographic and socioeconomic data were also collected. Half of the HIV-positive patients died during their hospital stay, compared with 30% of those who were HIV-negative. Length of stay in hospital was not different for the two groups as a whole, but HIV-positive patients who survived had a significantly longer hospital stay than surviving HIV-negative patients. Direct costs of the illness were significantly higher for HIV-positive patients ($170 vs. $110). This is one of the first studies from a low-income country which involved a random sample; which gathered data prospectively; and which included both HIV-positive and HIV-negative

patients. The fact that it was carried out in one of the biggest, busiest hospitals in the developing world proves that it is possible to do good research in almost any setting. A similar prospective, randomly selected study of both hospital and health centre treatment costs for both HIV-positive and HIV-negative adults is underway in a rural area of Zambia.[b]

Researchers from Latin America are reporting costs which are closer to those reported in the US than to those from Africa. This may reflect the fact that, at least initially, the AIDS epidemic in Latin America fitted Pattern 1, and thus affected groups in Latin America who had a similar pattern of health care utilization as in the US. Cordeiro (ref 38) presented a paper at the Global Impact conference on the costs of treatment in Brazil, which were estimated to be US$21,500, but few details were available on how the costs were calculated. Shepard (ref 143) wrote on the costs of AIDS in a "developing area" – Puerto Rico. It could be argued that Puerto Rico is so closely linked to the US as to be almost a state, albeit one of the poorer ones; and indeed, the AIDS treatment costs reported are nearly at the US levels, with total lifetime costs ranging from $11,773 to $51,842. Of this total, Shepard reports average lifetime inpatient costs ranging from $9,653 to $25,000, and outpatient costs ranging from $16,700 to $29,000. The average overall cost (weighted by costs in both public and private sectors) was $22,541.

A study from Mexico (Gonzalez-Block, ref 58) looked at the implications of AIDS under three projections. The burden on the Social Security system will be greater than on the public health system, which bore the costs of 40% of the AIDS cases in 1987 (although this assumes that the pattern will remain unchanged – an assumption which has not proved true in some other settings, such as the US). Unlike other writers, Gonzalez-Block concludes that while the budget for care will be adequate to pay for the expected cases, the budget for prevention and control is completely inadequate. There is also a presentation of costs of treatment from a limited sample of patients in one hospital.

Much of the literature on costs of treatment from developing countries fails to address the question of who will pay. In fact in much of Africa the majority of costs are borne by the patient and his family, and the treatment provided is determined as much by the patient's ability to pay as by what is actually medically necessary. Foster (ref 55) points out the need for clinicians to minimize the economic burden of treatment on the patient's family; paying for the treatment of a terminally ill AIDS patient can set off a downward financial spiral from which the family may not recover for generations.

---

b Foster S et al are currently undertaking this research, and preliminary findings are expected soon.

CHAPTER 5

THE WIDER IMPACT OF AIDS

The future impact of AIDS on society has only been guessed at, and it was surprising to find how little attention has been devoted to the wider economic and social implications of this worldwide epidemic. In part this is a result of the continuing uncertainties surrounding the epidemiology of HIV and AIDS. Economists have attempted to describe the wider impact of AIDS using two main methods which we review below. The first is by estimating "indirect costs" or the overall loss to the economy caused by illness and death from AIDS. The second, more common approach, is to look at the impact in more detail by sector or by group on whom the burden falls; the majority of the literature falls into this category.

Indirect cost estimates

To date, several authors have attempted to make indirect cost estimates of losses of production due to AIDS in developing countries using a variety of assumptions as to the age, sex, education, and income level of the persons who die of AIDS and whose economic contribution is therefore lost to society. One of the first and perhaps the most widely cited estimate is that of Over et al (ref 121), who estimated for Zaire that indirect costs of AIDS ranged from $890 for a rural adult to $2,669 for an urban adult with a secondary school education, and for Tanzania from $2,425 for a rural adult to $5,093 for an urban adult with a secondary school education. Over points out that indirect costs are much greater than direct costs (which include medical care costs), and account for 83-99% of the total costs of a case of AIDS. Shepard (ref 143) calculates indirect costs for Puerto Rico of $80,000 per adult and $56,000 per child AIDS case. These amount to 3.6 times direct costs; this ratio is significantly lower than that calculated by Over, and Shepard explains that this is because health care costs in Puerto Rico are relatively high for its GDP.

We have already seen that good estimates of the direct costs of AIDS and HIV infection are difficult to make, and the problems with making indirect cost estimates are even greater. Hay (ref 69) reviews the difficulties in using econometric techniques to value human life and project the indirect costs of the epidemic. He addresses the thorny issue of income valuation; and notes that "for the purposes of AIDS economic impact and other cost-of-illness studies, ... an egalitarian presumption is preferable. That is, it is appropriate to value each person's time equivalently by using average wage rates, average life expectancies, etc. ... The burden of justification [is] on those who would suggest an alternative (i.e non-egalitarian) approach." This approach would overcome some of difficulties present in Over and

Shepard's work and mitigate some of the ethical concerns inherent in valuing the life of a poor man at less than that of a rich man. Or of a women at less than half of a men

There are other difficulties with indirect cost estimation, and perhaps the question should be asked whether such estimates give a true picture of the economic consequences of a death from AIDS. It is true that a death from AIDS means that person will no longer contribute to the economy as a whole; but the real impact will be felt by his or her family, employer, immediate entourage, and local community. When a husband dies, the widow is deprived of his income and affection; his children of funds for food, clothing, schooling; the family may lose its land or other possessions. His employer is deprived of his skills; if he is the local schoolteacher or nurse his post may remain unfilled for a time. The death of a mother can have even more far-reaching consequences for the children, especially the youngest ones; in many societies in Africa, "orphanhood" is defined as the loss of the mother. Women are the main producers of food in many African communities, as well as the primary care givers. Death of the mother may result in children being sent to live with their grandparents (most often a widowed grandmother) which represents in some cases several steps back in development and in possibilities for the children. Indirect cost estimates cannot measure these impacts; and the fact that women's work is often underpaid or not paid at all would reinforce this undervaluation.

The impact of AIDS on specific sectors or groups

In view of the difficulties of making good indirect cost estimates, most economists have taken the alternative approach of attempting to cost the impact in a desegregated fashion, looking at the impact of AIDS on, for example, an economic sector or group. These include the economy and society as a whole; the family and the family economy; the health system and health workers; agriculture, industry, mining, and tourism sectors; and women as a special group. The literature also contains several references to the impact of AIDS internationally and the responses to date. These are reviewed below.

i. Impact on the economy and society in general

A good starting point is the article by Nabarro and McConnell entitled "The impact of AIDS on socioeconomic development" (ref 110). This reviews the material available in 1989 and provides extensive references. Another general introduction to the impact of AIDS is by Carswell (ref 27) which focuses primarily on Africa; the author spent a long time in Uganda. He observes that "compassion is a relatively fragile quality, easily exhausted by overuse." He also points out that there may be some positive outcomes of the epidemic, i.e. a reduction in

STDs, accelerated development of the health services, changes in sexual behaviour and a renewal of spiritual life. Two other articles which review the social and socioeconomic impact are by Rockwell (ref 131) and by Feuerstein and Lovel (ref 53). Rockwell notes that spending on AIDS may divert resources from other productive sectors. Rockwell, like Carswell, believes there may be some positive spin-offs of the epidemic: international organizations may demonstrate their effectiveness; international aid programmes may become more sensitive to local needs; nations in which health care is tied to insurance may be forced to provide universal insurance; and drug use may come to be viewed as a medical problem and thus become decriminalized. Prejudices against minorities may be confronted and conquered. (Of course it is also possible that none of these will occur.) Feuerstein and Lovel use data from southern Africa to illustrate the consequences for the economy, and propose the three stages of community response: fear when a first case is identified; seeking of assistance and counselling when people realize they themselves are infected; and when death becomes commonplace, making death a positive experience insofar as possible. They also suggest a possible positive outcome of the epidemic, i.e. the devolution of responsibility for care from politicians and health care workers to concerned community workers and subgroups (traditional healers, prostitutes). Becker (ref 13) reviews the recent demographic and epidemiological evidence and links it with economic impact; his is perhaps the most recent review article included in this paper.

Several books have been published which give a broad overview of the impact of AIDS; publication details are found at the end of the annotations. Fleming et al produced an edited volume of the papers presented at the Global Impact of AIDS conference held at the Barbican, London, in April 1988; Miller and Rockwell (1988) have edited a collection entitled "AIDS in Africa: the social and policy impact". A number of pieces in these books have been annotated separately. The PANOS dossiers give a comprehensive overview of AIDS and its impact; the dossier entitled "The Third Epidemic: repercussions of the fear of AIDS" reviews, country by country, the sociological impact of fear and discrimination worldwide.

Four articles were found which describe the overall impact in specific (African) countries. Goodgame (ref 59) describes the situation in Uganda, with emphasis on the clinical and health services impact. Fortin (ref 54) describes the "politics of AIDS in Kenya", focusing on the early denial of the importance of AIDS and the reaction to suggestions that AIDS originated in Africa. Whiteside (refs 167, 168, 169) reviews the situation in southern Africa, including South Africa, and suggests that by 1995, 20% of the population will be HIV-positive. Davies (ref 42), in a paper presented at a conference on the socioeconomic impact

COMMUNITY HEALTH
LIBRARY
AND
DOCUMENTATION
UNIT

of AIDS held in Harare, Zimbabwe, in March 1990, reviews the implications for Zimbabwe. He points out that there is evidence from other countries that HIV has spread faster among the more privileged groups, but that they are also more likely to be susceptible to behaviour change and education. In Zimbabwe, however, there is very high mobility between urban and rural areas, so the overall rate of spread would be increased while the urban/rural differences would be reduced.

ii. Impact on the household and on the family economy

The impact on the family can be divided into three phases, depending on the stage of the illness: during the illness, the period immediately following death, and longer term consequences. Ngugi (ref 114) describes the impact on the family, during all three of these phases, but especially during the illness, of a young man who died of AIDS in Kenya. The costs to the family included the lost investment in studies which were never completed; the mother's leave from her job to care for him; leave for a brother; missed school for younger siblings; special food and drink, and sodium hypochlorite (bleach) for cleaning; and the lost hours of work of extended family members who came to offer support (on average of 10 hours daily). Davachi and colleagues (ref 41) report on 33 families from Kinshasa who had a child hospitalized for AIDS. The average cost of a single admission (average 25 days) was three times the average monthly income ($90); but the cost of a funeral was the equivalent of 11 months' salary ($320). Clearly the longer term economy of the family would be affected by the death of even a very small child.

Increasingly attention is focusing on the problems of orphans – perhaps the most important longer term consequence of AIDS. WHO estimates that there will be 10 million AIDS orphans by the year 2000. Muller and Abbas (ref 109) report on the education of orphans in Uganda (some of whom were war orphans, not AIDS orphans). Of the families with orphans, 47% reported not having enough money to send the children to school, compared with 10% of families with no orphans. Hunter (ref 78) gives a disturbing account of an enumeration of orphans in Uganda, and describes the problems they faced with lack of money for food, shelter, school fees, etc. Another problem which is arising with increasing frequency is disputes regarding ownership of land; women may not be entitled to own or have the use of land if they are widows, which leaves them and their children without a source of livelihood. Preble (ref 128) describes a number of other consequences of AIDS for children in particular. Likely outcomes for orphans include adoption by relatives or others; placement in orphanages; abandonment; and premature death due to neglect and illness.

iii. Impact on the labour force and on specific economic sectors

Surprisingly little has been written about the impact of AIDS on economic sectors and on labour, even though this is likely to be one of the most important long-run effects of AIDS. In fact we found only one article which directly addressed the impact of AIDS on labour, two on agriculture, three on mining, and one on tourism. The impact on the health services and on health personnel has received more attention; this is reviewed below in section iv.

A number of authors have brought out the fact that in many countries, it is the better educated and higher socioeconomic groups who appear to have been most affected by AIDS (De Cock, Davies, Over, etc.) Whether this is because they are more affected, or because they have better access to health services and therefore are counted, is not yet clear. Christenson (ref 36) looked at the AIDS cases in Mexico as of November 1987 and found that they were non-manual workers, and included professionals, technicians, teachers, artists, administrative and office workers. Market sellers, peasants, and workers were under-represented.

Green (ref 63) notes that 68% of seropositive men in Zambia's Copperbelt were skilled professionals in the copper industry. He notes that "since many countries in this region have severe skill shortages, it is important to ask to what extent these workers can be replaced." In a footnote he further observes that of the ten African countries most affected by AIDS, only Kenya has a fairly abundant skilled labour pool as well as the capacity quickly to train more skilled workers. Even if workers can be replaced, rising turnover rates further reduce productivity; and the governing elite may become preoccupied and demoralized.

The copper and cobalt mining sector has received some attention, especially in Zambia where it accounts for about 90% of the foreign exchange earnings. Nkowane (ref 117) notes that the implications are lower productivity, the need to screen new recruits and the ethical implications of this, and the need to care for those who are HIV-positive (the mines have their own health services). The implications for the family are also reviewed. Desmond (ref 44) projects that 30% of the Zambian copper workforce will be infected by the year 2000, and one third of this workforce is skilled; extended training is required for replacement workers.

Agriculture remains the backbone of the economies of many of the countries hardest hit by AIDS. Surprisingly, then, we found only two publications on the impact of AIDS on agriculture. Gillespie (ref 56) assesses the potential impact of AIDS on the different farming systems of Rwanda. Five farming systems were characterized by the quantity and type of

labour input required; and the sensitivity of farming systems to labour loss depends on whether the age and sex groups most productive are also vulnerable to AIDS. Labour loss may induce a shift away from labour intensive crops such as legumes, to tubers such as potatoes, cassava, sweet potato; and there may be a reduction of cash crops such as coffee and tea. There may also be an impact on animal husbandry as children's labour becomes less available. Overall, nuclear families are more vulnerable than extended families, since a single adult death may force a change in family structure. Gillespie has also estimated the differential impact of male and female deaths depending on the labour balance and the gender specialization of labour in the particular farming system.

Barnett and Blaikie (ref 9) have carried out an important study in Uganda for the UK Overseas Development Administration, entitled "Community coping mechanisms in the face of exceptional demographic change". The study paid particular attention to the impact on agriculture and on farming systems. The authors found that coping mechanisms related to the farm include changes in work organization, i.e. increasing or decreasing the time spent on the farm, hiring of labour, or substituting other inputs for labour; changes in farm practice, i.e. decreasing cultivated area or crop range, eliminating cash crops or food crops, or adopting intercropping. They analysed the impact of AIDS on the estimated 50 used in Uganda and assessed their vulnerability to labour loss from AIDS; more than half were assessed as "very vulnerable" or as "vulnerable". The most vulnerable were systems in dry areas with one short rainy season; these had the "greatest seasonal peaks of labour demand as well as the narrowest choice of alternative crops." Their findings imply that pastoral and maize-based farming systems in nearby countries (i.e. Tanzania, Zambia) may be very vulnerable.

Finally we come to the impact of AIDS on tourism. The only article we found which specifically examines this issue deals with tourism in Thailand. Cohen (ref 37) found that AIDS and HIV infection had several consequences on tourism in Thailand, some of them positive. First was that there was a "mild but widespread xenophobia" due to the belief that AIDS is a "foreigners' disease." The Government's relative openness about AIDS "has produced no perceptible effect on the numbers ... of tourists." Secondly, bar owners and sex workers began to encourage the use of condoms; and anti-AIDS campaigns ironically benefited the tourism industry by reassuring tourists and publicizing tourism organizations. Third was that the AIDS publicity enabled Thailand to change its tourism policy to attract more families and fewer single male sex tourists. A final consequence was that AIDS sowed dissent and division within the sex industry. In summary, Cohen concludes that the AIDS crisis helped the Thai authorities to change the tourist's image of Thailand; and has taken a toll on the sex industry as a whole.

iv. Impact on the health system and on health workers

AIDS is already having a significant impact on the health care system in both high- and low-income countries. Foster (ref 55) estimates in that in very heavily affected countries, as much as a third of the health care budget may be already going to the care of HIV-related illness. Surprisingly this has not yet been documented in detail in developing countries. Hassig (ref 67) notes that the fact that Mama Yemo Hospital always functioned at full capacity, whereas now 50% of the Department of Internal Medicine admissions are HIV-positive, implies that a significant displacement of "regular" admissions has taken place. This is supported by the high mortality (30%) in HIV-negative patients, which suggests that they are being admitted only when in a very serious condition. N'galy et al (ref 112) refer to this problem and to the difficulty of managing AIDS and HIV-related infection with limited resources, a problem which is further developed by Goodgame on the basis of his experience in Uganda (ref 59).

Johnson and Miller (ref 82) use data and experience primarily from the US to look at the impact on hospitals, but they draw some conclusions for Africa as well. They point out that projections of bed use and costs are of limited use because of uncertainties except in the short term; and in Africa, cost of care must be balanced against prevention programmes. (In fact the issue is not yet acute in Africa, since in general care is locally funded, while much of the AIDS prevention effort is funded externally.) They also point out that the costs of care cannot be divorced from the question of who pays (see chapter 4, section i above). In Africa and elsewhere in the developing worlds, the issue is not so much who will pay, but rather how to share out the existing resources between competing demands for care of HIV-disease and other conditions. Green and colleagues (ref 64) have projected the impact of AIDS on hospitals in the US, and their article is interesting in that it goes into some detail regarding the cost components.

The impact on hospitals in low-income countries is described in unpublished annual reports of the individual hospitals and AIDS committees. One such report is that of the Kabanga Hospital (Tanzania) AIDS Action Committee (Wall, ref 162); problems mentioned are the lack of counselling facilities for people who test HIV-positive, and the lack of blood screening equipment which led to a number of transfusions which were unscreened. A short report from India (ref 24), which is gradually waking up to the severity of its own AIDS problem, points out that unless drastic measures are taken there will be rapid spread of HIV through infected blood and blood products and that admission of people with AIDS to hospitals poses problems of infection control. (Unfortunately reports indicate that some doctors in India are refusing to treat, and sometimes to admit, HIV-positive patients: this is not the recommended method of infection control in a hospital.)

Two issues related to the impact of AIDS on the health services in developing countries merit special attention. One is the importance of tuberculosis in the overall morbidity and mortality picture; Harries (ref 66) reports that Tb is found in approximately a third of HIV-positive patients. It is often found in different forms than in HIV-negative patients, making diagnosis more difficult; often HIV-positive patients have hypersensitive reactions to standard chemotherapy agents and require more costly regimens. Although treatment is usually successful, a study in central Africa found that mortality 12 months after starting treatment was 32.5% in HIV-positive patients, compared with only 1.5% in HIV-negative patients. Harries concludes by asking "Where will the money to investigate and treat these patients come from? The combination of a bacteria identified in the 1880s and a virus isolated a century later will be an important challenge for medicine in the years ahead." Slutkin et al (ref 146) and Styblo (ref 152) give further details on the association of HIV and Tb in both developed and developing world; Styblo makes the additional point that health personnel dealing with Tb patients are exposed to a greater risk (from both Tb and HIV) than other health personnel.

Indeed, the second special issue which needs to be addressed with some urgency is the impact of caring for HIV-related illness on health personnel. Many developing countries spend 60% or more of their health budgets on staff; yet little is being done to maintain or protect this valuable "capital" of the health system. Although available literature has not documented a significant risk of transmission through the health care system (see chapter 2, section i above), their work places them under severe stress and the risk of "burn-out" is great. They are clearly a category of worker which will be difficult to replace, not only because of the length of training and special personal skills required by medicine and nursing, but also because the field is less attractive when it involves caring for large numbers of terminally ill young adults and, increasingly, children. Added to this are the fact that health workers are severely underpaid for the most part, and they work in an environment where more often than not resource constraints mean that they do not have the equipment, drugs, and so on to do their jobs properly, nor have the minimum protective equipment (gloves, disinfectants, adequate numbers of syringes, etc.) been provided. Two articles review the situation with regard to health staff primarily in the US; one, by Volberding (ref 161), makes several suggestions for reducing stress and improving the situation for health care workers. Cotton (ref 39) discusses a number of issues, among them the difficulty in recruiting nurses and some specialists, i.e. internists and paediatricians.

v. Impact at international level

The AIDS and HIV pandemic has implications which go well beyond national borders. But as Christakis (ref 35) points out in his interesting article on "international interests in AIDS control", not only the disease, but also ideas, care providers, and investigators are able to move around the world. Much effort has been expended, especially by WHO, on the channelling and the sharing of ideas, research, and practical approaches to the disease; and it is clear that this has been to the benefit of all. Mann (ref 100) points out that "the global effort to prevent HIV infection is unprecedented .... In October 1987 AIDS was discussed ... by the United Nations General Assembly, marking the first time a specific disease was considered by the world's highest political forum."

Christakis notes that international interests arise 1) when one nation has an interest in the control of the disease in another nation; 2) when certain aspects (i.e. medical or technical) are of interest to two or more nations; 3) when one nation needs others to help it to control AIDS and; 4) when health is viewed as a global resource. Obstacles to international collaboration include 1) practical issues such as poor statistics, shortage of researchers, etc.; 2) diverging national interests, i.e. the Netherlands' concern is with drug use, whereas in Africa this is of little interest; 3) lack of consensus as to how AIDS is viewed by different countries, i.e. as a medical, social, or criminal problem; 4) mutual mistrust between countries and; 5) cultural dissonance, for example, differences in concepts of medical ethics. Earickson (ref 51) reviews information about the social responses in both developed and developing countries, and discusses the political and legal implications as well.

As noted above, several authors (Rockwell in particular) believe there may be positive benefits of the epidemic in terms of improved international response and increased effectiveness of international organizations. Christakis comments that an international agency such as WHO has a role in supplying professional staff and in coordinating the distribution and quality control of pharmaceuticals. Desmond (ref 45) describes the overall response of the United Nations system to the AIDS pandemic. The UNDP (ref 155) is expanding its response to the social and economic consequences of the pandemic, in particular the implications for development assistance.

Increasingly the World Bank, a specialized agency of the UN system, is playing a role in funding the control programmes for its member countries and in carrying out AIDS-related socioeconomic research. A draft chapter on AIDS and STDs was prepared by Over and Piot (ref 122) as a part of a longer study on adult health priorities; it contains much interesting information and brings an unusual (and in some cases controversial) approach to some of the

economic aspects of control and treatment of AIDS. An "agenda for action" (ref 171) was prepared in 1988; the strategy was to increase resources for AIDS prevention and control; to complement WHO/GPA's activities; and to assist governments in priority actions. Since that time free-standing AIDS control projects (i.e. not components of other health projects) have been approved or are under preparation for several African countries, including Zaire and Uganda. A major World Bank-funded economic study of the impact of AIDS is getting underway in cooperation with researchers in Tanzania and with WHO.

CHAPTER 6

CONCLUSIONS: AIDS, ECONOMICS, AND RESEARCH PRIORITIES

The major impact of AIDS is still to come; WHO's estimate is that there will be a tripling of new infections in the 1990s and a ten-fold increase in new cases (Mann, ref 100). The 1990s will be much more difficult than the 1980s have been. Mann also points out that another important thing to bear in mind is that "even in the most heavily affected countries, such as Uganda, in which at least one million of the 15-16 million inhabitants is already HIV-infected, the vast majority of people remain uninfected." In view of this situation, economists need to be aware of the impact of their horrific cost estimates, which lead government policy makers as well as donor agencies to simply throw up their hands in exasperation and consequent complacency, while much more needs to be done.

To summarize, we found that most of the economic work to date has been done on costs of treating AIDS, especially in the US. Much of this work suffers from the fact that it was not accompanied by costs of other similar diseases to enable fair comparisons to be made. Cancer is costly to treat, and often the outcome is poor; yet few have dared to suggest that resources not be allocated for the treatment of even terminal cancer patients. West's point (ref 166) that many of those making decisions about allocation perceive themselves to be at little or no risk of catching AIDS is pertinent; most decision makers, like the rest of us, fear cancer much more than AIDS, and make decisions accordingly.

In addition to the work on the costs of treatment, we found a small but sometimes excellent body of work on individual sectors, i.e. agriculture, mining, and tourism. The work on women and children is also particularly good, and while not approaching the problem from an economic point of view, provides an excellent background for beginning to look at the economic issues.

What did we find? We were struck first of all by the extent to which the literature, insofar as it refers to any developing area, refers mainly to Africa. There was very little to be found on Latin America or on Asia, but the AIDS problem in some Latin American cities, and in some very populous Asian countries, may soon rival that of Africa. We were also surprised at the almost total absence of any research on the economics of prevention and control of HIV infection. In many ways AIDS could be considered an occupational disease; we have referred to the literature on mobile population groups and it seems that workplace-based prevention activities could be highly cost-effective.

HIV infection and AIDS are extremely complex illnesses which pose a myriad of interesting economic and socioeconomic questions. We have tried to identify areas where socioeconomic research could be to governments and others trying to cope with the burden of AIDS and HIV. These are listed below, following the same organizational schema which was used for the publication as a whole.

How many will become ill?
Who will become ill?

- workplace and occupational risks (mobility, exposure to patients, etc.) and prevention possibilities need to be investigated further

How much will it cost to slow the spread of the infection?
How effective are available approaches?

- cost-effectiveness studies of various prevention and control strategies, i.e. face-to-face, various forms of mass media, health workers, etc.
- distribution of condoms, sites, effectiveness of promotion etc., and pricing and affordability issues
- diagnostic testing: economic evaluation of testing sequences, informing patients of positive results, etc.
- screening of blood transfusions: improved procedures for recruiting low-prevalence donors, costs and cost-effectiveness of various testing sequences, development of new tests, cost-effectiveness of alternatives to whole blood
- protection of health workers: economic evaluation of improved protective measures, replacement costs of workers who leave
- economics of the drug trade, incentives and disincentives to take up injectable drug use, cost-effectiveness of harm minimization schemes in developing countries
- socioeconomic characteristics of prostitution: is it supply or demand-led? will reducing supply by providing alternative employment or jailing prostitutes do anything to reduce prostitution, or will it merely raise the price and attract new entrants? why do men use prostitutes? why do women (and men) enter prostitution? can either or supply or demand be affected to reduce the overall volume of paid sex?

How much will it cost to treat the infection?

- comparison of costs of treating HIV and AIDS with costs of other comparable illnesses, especially in a developing country setting
- quality of life issues: which treatments improve quality of life of the patient, and of his family or household? which actually diminish the quality of life?
- direct non-personal medical costs of blood screening, precautions, health education, research, etc. have not been investigated in a developing country setting
- indirect costs incurred by families of AIDS patients (travel, time, etc.) and ways to minimize these
- prophylaxis of common infections, especially Tb (both difficult and costly to treat and very common)
- ethical and economic issues surrounding clinical trials, vaccine trials, cost of key AIDS drugs

What wider economic consequences will ensue?

- impact on agriculture and food production; impact on specific farming systems
- impact on industry, extractive industries, services, etc.
- impact on health financing mechanisms, insurance systems, pharmaceutical sector
- vulnerability of various sectors and industries to labour shortage, etc.
- impact of AIDS on educated groups
- coping mechanisms of households (labour allocation, production shifts, sale of assets, etc.) and ways to support and assist stressed families to prevent permanent disruption or decomposition of the household
- orphans: major problems encountered and intervention strategies to prevent the wastage of AIDS orphans

Of course there are many important research topics which we have not mentioned. The point is that economics and economists have a key role to play; they must make the thought processes, the approaches, and the methods of economics available, and accessible to as many people as possible. Economic thought and research can help governments, the health services, NGOs, and donor agencies to decide what to do now that AIDS is here to stay.